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The Value Of . . . Summer Cover Crops

R. M. BARNETTE, CHEMIST
FLORIDA AGRICULTURAL EXPERIMENT STATION

An adequate summer cover crop growing during the rainy season is recognized as being essential for the conservation of the fertility of the cultivated soils in Florida. The value of summer cover crops cannot be over emphasized in each of the various types of culture in the State and the fundamental basis for their value should be thoroughly appreciated. The adaptation of different cover crop plants to the various cultures and soil types is a matter of constant trial and careful experimentation, as the problems underlying their best use are many and varied.

It is therefore difficult to make hard fast rules regarding the use of cover crops for the different cultures. For citrus soils, it appears desirable to produce the cover crop giving the maximum tonnage at the least expense. For truck soils, the question of the physical makeup of the cover crop is important, for rough woody organic matter is difficult to handle in the soil with succulent fast growing truck crops. For deciduous crops, the heavy yielding crotalarias have proven popular during the past few years, and for general farm crops some types of feed crop or weeds have proved useful over a long period of years. The most important point is to maintain a land cover and to appreciate its value.

During the long days of summer, the sun will raise a few inches of the surface of an exposed soil to a high temperature which is detrimental to many desirable bacteria and other organisms in the soil. It can easily be shown that a growing cover crop will lower such temperatures from 10 to 15 degrees Fahrenheit. At times, even the temperatures of the lower depths are appreciably lowered. This lowering of the excessively high temperatures of the soil during the summer months is without doubt a very desirable soil-conserving effect of the cover crop.

On the sandy soils, especially the deep sands, summer cover crops are valuable in preventing the leaching of plant nutrients. They affect this conservation of nutrients both by the absorption of the nutrients themselves and by decreasing the quantities of water leached. Perhaps it would be expected that the highest yielding cover crop would conserve the most water and most effectively prevent the leaching of nutrients. However, this need not necessarily be true. There appears to be a closer tie-up between the maximum growth period of the cover crop in relationship to the maximum distribution of the rainfall than between the maximum tonnage produced and the total rainfall. This is especially true for the leaching of water. Therefore, the selection of a cover crop from the standpoint of maximum prevention of leaching is difficult, as the seasonal distribution of rainfall is quite variable during the summer months of different years. However, it is evident that the prevention of leaching is one of the most important soil-conserving benefits of summer cover crops.

In addition to these benefits, perhaps the most important benefit derived from cover crops is the return of organic matter to the soil. The incorporation of a fresh supply of organic matter to mineral soils at intervals has been and perhaps will remain for a long time, one of the most important agricultural practices. Under Florida conditions, particular attention must be given to maintaining an adequate supply of rough organic matter in the soil. At present such a procedure appears the only feasible way of assuring solution of plant nutrients and renewal of a favorable concentration of these essential elements for plant growth. Often, when

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Citrus Grove Management

Some Important Seasonal Reminders To Citrus Growers

BY E. F. DeBUSK

CITRICULTURIST, FLORIDA AGRICULTURAL EXPERIMENT STATION

I am offering for your consideration a few suggestions on summer fertilizing, the cover-crop, irrigation and the control of rust mites and red spiders.

In areas or individual groves affected by drouth during the previous years or the cold of December, 1934, a very heavy infection of melanose is noted on the foliage, especially of grapefruit. In most instances this infection came rather early, before the fruit had set or was large enough to become infected. Recalling past experiences under similar conditions, we have reason to conclude that much of this heavy infected foliage will drop off by the latter part of the summer, resulting in a light foliage from the spring growth. Since it is extremely important to maintain a heavy foliage to produce size and fruit of quality, I feel that attention should be called to the fact that under the conditions described especial consideration should be given to the summer fertilizing. In view of the possibility of a loss of foliage and due to the fact that there has been more than a usual amount of leaching of plantfood this spring, special effort should be made to produce a heavy summer growth to make sure of the foliage that will be needed. To make this growth it will be necessary to apply fertilizer a little more liberally than usual, and it would seem desirable to apply it a little earlier. The earlier application should speed up the growth of the fruit and make for better sizes. If the large crop in prospect materializes, we shall be confronted with too much fruit of the small sizes unless the fertilizing and water supply are very favorable for growth.

Another point about the summer fertilizing which should be kept in mind. Since there is quite generally a heavy spring growth, it would seem to be a favorable opportunity to build up the reserve in trees of many of the plant nutrients that may seem to be deficient. Apparently trees are in better condition to utilize the minor elements as well as the major plantfood elements when they are carrying a heavy foliage.

I believe it is worth while calling attention to a mistake that is often made in regard to the summer cover-crop. In sections that have had rainfall recently it is noted that the cover-crop is starting with a good stand. Under these conditions cultivation at this time may greatly reduce the summer cover-crop. In many instances in the past a crop of crotalaria, beggarweed and even Natal grass has been either destroyed or greatly reduced by too much cultivation after the cover-crop had started. The importance of a summer cover-crop in the grove is generally recognized. If attention is given to getting it started, and a light application of nitrogen is made about the first of July, the grower is usually rewarded by a satisfactory crop.

In sections not visited by the recent showers considerable dropping of young fruit may be realized unless water is supplied within a very short time. Growers who have irrigation plants should make full use of them in an effort to hold the crop of fruit and speed up the growth, because we shall undoubtedly have a large crop of fruit to market next year, and we have reason to fear too many of the small sizes. Attention is called to the fact that drouth may cause considerable dropping of young fruit before the trees present appreciable evidence of moisture deficiencies. Growers should not wait until the trees show wilt before applying irrigation water, at this season of the year. This is the critical time with reference to moisture supply in producing a large crop of fruit. It must be borne in mind that citrus trees need much more water at this season of the year than at any other time. One need only to refer to the past rainfall records and their influence on crop production to see the importance of an abundance of water at this season of the year in holding the crop and making sizes. The grower should examine the soil with a posthole digger, soil auger, or shovel and determine the moisture content at different depths. One can be easily misled by simply examining the soil a few inches down as a light application of irrigation water or a light rain may show sufficient moisture in the top soil when the dry conditions further down make it impossible for trees to feed and function normally. To get the full benefits of fertilizer and to enable the trees to hold the fruit and produce desirable size it is necessary to have a supply of moisture throughout the entire root zone, at this season of the year. Of course in the fall and winter this may not be so necessary, as the demand for moisture is not as great at that time.

If an abundance of irrigation water is available the entire area should receive a sufficient amount of water to soak down through the root zone but if a limited supply of water is available it can be made more efficient by applying it under the trees in such a manner as to allow it to soak down where the highest root concentration is found. On the other hand if a limited amount of water is applied all over the surface much of it will evaporate and it will not be as effective, as much of it will not reach the roots of the trees.

In low lands the effect of drouth may be more severe than usual this year, because the heavy rains in late winter and early spring forced the new root development of the trees closer to the surface than under normal conditions. These conditions make an increased demand for water upon the upper part of the root zone. Under such conditions the moisture supply should receive special attention.

Attention is called at this time to the fact that the 6-spotted mite, a

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species of the red spider, is doing a great deal of damage in groves throughout the ridge section of the citrus belt. Even in groves that have been sprayed with lime-sulphur, this mite is on the increase. In most instances this is due to the fact that the sulphur spray was applied hurriedly and to the top of the foliage only. Many leaves have been examined that were covered with spray on top and not touched on the underside. On the underside of these leaves, the 6-spotted mite had been disturbed very little in its mission of feeding on the leaf and reproducing. This should be sufficient to suggest the importance of directing the spray solution to the underside of the leaves where it is desired to control this 6-spotted mite. It is noted that it is found in colonies on the underside of the leaf where it has caused the leaf to slightly cup, giving it protection. A lime-sulphur solution of 2 gallons to 100 gallons of water will control this mite when it is properly applied.

In most sections of the citrus belt rust mites are very numerous where they have not already been controlled. They are rapidly and persistently moving on to the young fruit. Sulphur in any of the forms recommended in the Florida Citrus Commission spray and dust schedule, when properly applied, will control these mites and give protection to the fruit. If a grower does not have a copy of this spray program he should by all means apply for one and follow it very closely in an effort to produce bright fruit this year. It is generally known that the rust mite causes the fruit to become dark in appearance and thereby lowers its market value in most of the markets. It must also be kept in mind that this same pest stunts the growth of the fruit, resulting in sizes about 12½% smaller than bright fruit on the same tree. It is easy to see how this may lower the value of a crop both by reducing the number of boxes produced and by throwing the fruit into smaller sizes which are usually discounted, especially during the season of large crops. The control of rust mites presents an opportunity to make money, by increasing the value of the crop, that growers cannot afford to neglect. Let's get an early start on the rust mite control. Don't wait until the car is stolen before locking the door.

Production Credit Association Stockholders' Annual Meeting

The Annual Meeting of the Stockholders of the Orlando Citrus Production Credit Association was held on Thursday, July 9, 1936 at the San Juan Hotel, Orlando. There were 256 present, of whom 121 were stockholders. Talks were given by Mr. A. E. Pickard, President, prominent growers throughout the State, representatives of the Farm Credit Administration and Mr. Sam J. Overstreet, who gave the Treasurer's Annual Report.

Mr. Ernest Graham, President, Production Credit Corporation, Columbia, S. C. discussed production credit loans in the Third District, comprising the States of North Carolina, South Carolina, Georgia and Florida; and other information pertaining to the Farm Credit Administration, stating that the Farm Credit Administration consisted of a "family group".

"We, in Columbia," said Mr. Graham, "and those with whom we come in contact in Washington, want the Orlando Association and other Associations, to forget about Columbia and Washington and to realize that your success is depending upon the management of the Association and the cooperation of the members. In other words, the stockholders, or members, should think of their local Association when thinking about obtaining production loans and not Columbia and Washington. We are a part of a "family group" and you will no doubt be interested in knowing that there are 560 Production Credit Association in the United States, of which all have made splendid progress since organization, making a total of $400,000,000.00 loans. For many years farmers and growers have asked for some system of their own to be worked out and they have now proved that they are capable of running their organization. The details have been worked out with the assistance of the farmers and growers and the Production Credit Corporation of Columbia. Altho it is not yet a perfect system, with the continued help and cooperation of the farmers and growers, there will be a perpetual source of credit."

Mr. Graham urged that only sound loans be made. He state that investigations and study had been made of the citrus industry and that the program the growers of Florida had started should be encouraged, stating that Florida had the best opportunities and possibilities to produce the best citrus fruits in the entire world. "I want to congratulate you and your Association on the progress you have made and to assure you that I, personally, and those in Columbia and Washington believe in Florida and in your possibilities," said Mr. Graham. "Also," he continued, "in closing, I appreciate the first opportunity to attend your annual meeting and hope it will not be the last. I shall watch your progress month by month."

On acid muck soils to be used for pasture, carpet grass usually does better than other grasses. Muck soils which are not very acid should grow Dallis, Para, centipede, and Bahia grasses for grazing until fall. Carpet grass also does well on soils that are not so acid.

Interest in 4-H clubs for boys continues to grow in Orange County—new clubs were organized recently at Beaulah, Winter Garden, and Zellwood, reports County Agent K. C. Moore.

Traffic Cop: "Don't you know what I mean when I hold up my hand?"

Lady-driver: "I should. I've been a school teacher for 25 years."

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CITRUS COMMISSION TAKES ACTIVE STEPS

That the Florida Citrus Commission is taking active steps to promote the use of Florida citrus fruits among our winter guests through the co-operation of Florida hotels and eating houses, is the statement of Mr. Marvin H. Walker, publicity director of the Commission.

In a letter to the editor of The Citrus Industry, Mr. Walker outlines the work already being done and that contemplated by the Commission along the lines indicated in an editorial in the last issue of this magazine. Mr. Walker says:

"Answering the question asked in the editorial in your June issue, the members of the Florida Citrus Commission recognize the opportunity to increase the demand for our grapefruit, oranges and tangerines by acquainting winter visitors to this state with these fruits. They have taken steps to do the very things which you say should be done.

"The first goal in this part of the Commission's program is to get Florida tourist hotels to serve citrus fruits in attractive ways at all meals, at reasonable prices, and to get these hotels to place bowls of fruit in their rooms when guests arrive. It is also hoped that we will be able to get the hotels to serve free grapefruit juice and orange juice to their guests in unlimited quantities, during the breakfast period.

"Cooperation in this matter has been promised by the Florida State Hotel Association, which has appointed a special committee, of which Mr. George Mason, of Tampa, is chairman, to work with the Commission. A special committee also has been named by the Commission, of which Mr. Luther L. Chandler, of Goulds, is chairman, to work with the hotel men and to get Florida eating places to feature our fruits during the tourist season.

"As you so ably pointed out, the free serving of grapefruit juice and orange juice is not only good advertising for citrus growers but it also helps hotels and restaurants. Mr. Mason told me a few days ago that he has had such splendid results from serving free juice in the morning that he plans to offer it to his guests returning to their rooms late in the evening. He believes and rightfully so, that people should drink citrus juice before retiring as well as the first thing in the morning.

"By educational methods we hope to get Florida restaurants and soda fountains to serve fresh orange and grapefruit juice, in season, at reasonable prices. About the hardest thing to buy in Florida is a good five-cent glass of orange juice, and in many places it is impossible to even get a good 10-cent glass of juice. One Florida hotel this past winter charged me $1.50 for a quart of orange juice! There is a great deal of work to be done in popularizing citrus fruits in Florida. You may be assured that the matter is receiving the Commission's serious consideration."

The Citrus Industry is glad to note this activity on the part of the Commission, as it believes that no greater service can be rendered the citrus growers of Florida.

In this connection, we are glad to give voice to a suggestion which comes from Mr. R. W. Bennett, of Breezy Point Groves, Babson Park, Fla., that similar steps should be taken to interest boat lines and railroads which bring thousands of visitors to Florida each year, to encourage the serving of Florida citrus juices, either free or at moderate cost, to the many patrons they serve. Mr. Bennett suggests that the Commission include railroads and boat lines in their missionary work. The Citrus Industry believes that the suggestion is worthy of consideration.

HOW FARM DEBT ADJUSTMENT AIDS GROWERS

Under Florida's farm debt adjustment program, the threatened foreclosure of 1479 farms and groves, embracing 108,863 acres of land in 60 of the state's 67 counties, was averted through the adjustment of $3,442,269 of mortgage indebtedness during the 18 months ending June 30.

These figures appear in a report issued by S. Lahr Miller, executive secretary to the Florida Farm Debt Adjustment Commission and state farm debt adjustment supervisor for the U. S. Resettlement Administration. The federal agency and the state commission, which was organized late in 1934 by Governor Dave Sholtz and of which J. P. Newell of Tallahassee is chairman, conduct the Florida program jointly. Of these cases in which adjustment involved refinancing of debts, 580 settlements included the payment of $101,637 in current and delinquent taxes.

In 708 of the cases, $2,293,700 of principal indebtedness was refinanced for $1,630,526, or a scale-down in excessive debts of $663,174, Miller's report shows. The remaining 771 cases, with original indebtedness of $1,148,569, were adjusted by various methods, including extension of time or reduction of interest rates by original creditors to provide terms of repayment consistent with the present means of farmers and growers.

The committees are now engaged in the settlement of 246 pending cases having combined indebtedness of $1,121,018, Miller's report shows.

Florida Agricultural Research Institute
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Lyons Re-elected President Research Institute

The Annual Meeting of the Florida Agricultural Research Institute was held at Orlando on July 17th. C. W. (Joe) Lyons of Tampa was re-elected President for a third year of service.

The Institute is a non-profit organization composed of many of the leading fertilizer and insecticide firm in Florida and was formed in 1932 for the purpose of assisting in the development of "Better Agricultural Practices" in Florida. It has done, and is continuing to do, some field work in various sections of the State, but feels that practically all of this work should be done by public agencies so that facts as developed may belong to the public and be available to all growers and farmers as well as the fertilizer and insecticide industries.

Reports were heard from Institute officers and committees and a Plan of Work for the future was laid out which called for additional activities in several directions.

In an interview with Mr. Lyons following the meeting he said in part "During the four years of the Institute's existence we are happy to have been of some assistance in connection with many of the problems confronting Florida agriculture. We have never tried to bally-hoo ourselves, f e e l i n g that growers and farmers much prefer to see results." Continuing, Mr. Lyons said, "Many growers have asked me in the past four years just how our work benefitted them. This is a question that I am always glad to answer. Through the information we develop and collect our companies are in position to manufacture better fertilizers and other products, and likewise, to make recommendations to the public for their more intelligent use. This naturally must benefit growers and farmers and our whole set up is such that agricultural producers must benefit by our work before we in turn can benefit."

With particular reference to fertilizers Mr. Lyons said, "Reports from all over the State indicate that growers are definitely getting back on production programs with two fundamental thoughts in mind, namely, production of quality fruit and making a reasonable profit. This is quite general, but at the same time, some few growers continue to talk of certain fertilizers as being 'old line' mixtures. This is a mis-nomer and the term 'single strength' is a better way to describe such fertilizers.

"In the old days growers used fertilizers on the basis of nitrogen (ammonia), phosphoric acid and potash content. Today we consider very definitely many additional plant foods in the manufacture of fertilizers. While it is true that many of the old time mixtures contained these additional elements and plant foods yet, in the light of present day knowledge, we have been able to make many improvements in our business for the direct betterment of the growers.

"Now in the better fertilizers, we give consideration to calcium, magnesuim, sulfur, chlorine, and for various sections, soil or crop conditions we likewise consider and use, where necessary, of manganese, copper, iron, zinc, and other elements.

"One of the principal advantages of single strength fertilizers lies in the fact that a ton may contain not only all the nitrogen, phosphoric acid and potash required, but can also contain necessary amounts of calcium, magnesium, sulphur, chlorine and other plant foods. This is of particular advantage to growers in many ways and effects an actual saving to them as well as maintaining the soil in a profitable and healthy condition. Some few growers have felt that single strength mixtures contained too little plant food, but these same growers are realizing more and more every day that a single strength mixture such as a 4-8-8 may also contain 10 units of calcium, 2 to 5 units of magnesium, 4 or more units of sulphur, 2 or more units of chlorine, making a total of from 40 to 45 units of plant food, very valuable but small quantities of minor elements and, also, varying quantities of natural organic material having a very high biological value. It is also true that the 40 to 50 units of necessary plant foods contained in such mixtures are not found in other types of fertilizer. Please don't think that we feel that such fertilizers are universally the best nor that side dressings, top dressings and extra applications of various other materials are not important. On the other hand we recognize the definite value of these other items under certain conditions but the facts seem to be that the type of mixtures referred to above serve as the best foundation for fertilizing practices. In other words they are the back-log, and additional fuel is desirable from time to time.

"We are very much interested also in information concerning soils and soil analyses. The Experiment Station and Department of Agriculture have been doing some good work along this line and we understand the Experiment Station's program of soils work may be expanded. It has been our hope for some time to see soil analyses made in a uniform manner under methods that have been proven by research to be adapted to Florida soils. Due to the wide differences in analyses and recommendations now being made in the State, and also to the apparent ease with which so-called soil experts are developed we feel that this is one of the outstanding needs for Florida growers and farmers today.

"Leading fertilizer companies no longer think of their business as manufacturing simply a 5-7-5, a 4-8-8 or any other particular analyses. The broad conception prevails now which is the supplying of plant foods and ingredients necessary for optimum plant growth, regular crop production and profit for farmers and growers; and further, that the mixtures must be so designed as to insure permanent soil fertility. In most instances, it is true that such mixtures are still known as 4-8-8's or what-not, but in addition to the 4-8-8 analysis the other plant foods and crop and soil needs are present in the better grade of mixtures.

"This is a very plain and simple way in which to state the matter, but it actually involves the collecting of a great deal of information pertaining to soils and crops so that fertilizers may be thus properly manufactured.

"In this respect fertilizer manufacturers are in a unique position to serve growers and farmers. This is due to the fact that fertilizer mixing companies, which have the cor-

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Fertilizers, Citrus Fruits

Summer Citrus Fertilization

R. W. RUPRECHT
CHEMIST, FLORIDA AGRICULTURAL EXPERIMENT STATION

In trying to decide what to use to fertilize the grove at this next application at least two things should be taken into consideration. First, we should remember that we have had a very wet winter and early spring. Second, when did you apply the spring fertilizer?

As most of you probably realize, the rains this winter and spring probably washed out of the soil most of the readily soluble plant foods. These rains also stimulated a heavy bloom and a good growth of leaves and stems. Thus these two factors have left the ground rather low, if not entirely lacking, in quickly available plant food. The time of your spring fertilization is important because if you applied it early and it was made up largely of inorganic materials or chemicals probably all that the trees did not get has been washed out of reach of the tree roots. If the application was put on late, just previous to the time the rains stopped, a goodly portion is probably still in the soil. If you used a complete fertilizer containing considerable organic nitrogen compounds at least some of the nitrogen will still be left in the soil.

We believe that if you fertilized early with inorganic or chemical fertilizer, a fertilizer containing at least 4% nitrogen would be advisable. If you are following the practice of putting on all of your phosphoric acid in one application a year, this next application would probably be the best time to apply it, especially if you are using a raw rock application or bone meal as the source of phosphoric acid.

As for potash, our experiments at the Citrus Station have shown excellent results on that type of soil which is fairly typical of the soils found on the Ridge with 3% potash in the fertilizer for grapefruit and late oranges.

At the low price at which the raw phosphates can be purchased at the present time, a good many growers have found it more economical to use this material as the source of phosphoric acid. While we have no recent experiments comparing raw phosphate with super-phosphate, we believe that if about twice as much of the raw phosphates are used as of superphosphate, sufficient amount of phosphoric acid will become available for the needs of the tree. This is especially true if a heavy cover crop has been incorporated with the soil.

Sulfate of ammonia is still the cheapest source of nitrogen and can safely be used unless the soil acidity is below pH 5.0. When sulfate of ammonia is used, especially on soils having a high acidity, it is advisable to have some liming material, preferably dolomite, also present as this will counteract any acidic residues and add some magnesium in addition.

As stated on previous occasions, so far we see no valid objection to using the muriate of potash as a source of potash. This is the cheapest source of potash. If you can afford we would suggest that you try out the low grade sulfate of potash magnesia. We have been getting somewhat better yields with this material than with either muriate or high grade sulfate of potash. If dolomite is used in the mixture as suggested above you will be getting some magnesium and it will hardly be necessary to use the low grade sulfate of potash to supply this element. Or muriate of potash can be used and supplemented with some magnesium sulfate.

In addition to using fertilizer do all you can to encourage the growth of a cover crop wherever it is possible. Practically all of our soils are in need of additional organic matter or humus, and the cheapest way to get it is to grow it. It does not make a great deal of difference what the cover crop is so long as you have something growing. If you have a legume cover crop you are adding some nitrogen as well as organic matter to your soil. With the present low price of nitrogen, however, it hardly pays to go to any expense to plant a leguminous cover crop.

Just one word of caution: Do not get the idea that lime or liming materials and some of the less common elements will take the place of regular fertilizer. These materials have their place but it is not as a substitute for regular fertilizer. Furthermore, unless you are certain that you need some of the less common elements, do not use them except in an experimental way. All of these materials are toxic if used in too large amounts. As we have stated on several occasions, the old idea that if a little is good, more is better, does not hold for these materials. More in this case is likely to spell disaster. For this reason the grower should hesitate to purchase mixed fertilizers to which the manufacturer has added some of these materials. He does not know how much fertilizer per tree or acre you are going to use. While the content of the less common elements in his fertilizer might be just right if, for instance 2000 lbs. per acre were used, the use of 4000 lbs. per acre might prove highly injurious. Of course, most fertilizer will contain small amounts of these elements which were present as impurities in the materials used in mixing. Such amounts are so small as not to be dangerous. It is only when the manufacturer claims to have added rare or less common elements that you should be wary. In the majority of cases we believe it is safer where it is known that some extra elements are needed to apply these as a separate application. Then you know exactly how much you have supplied.

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Freight Rates

Our Wobbly Rate Structure

BY H. C. CASE

AT ANNUAL MEETING FLORIDA STATE HORTICULTURAL SOCIETY

By reason of united action, Florida's citrus industry has attained two major objectives during the past year. Through new State laws, effectively administered by the Florida Citrus Commission, it has accomplished the standardization of grade and pack, and has made a good start on advertising. It is now moving toward control of distribution through a new Federal marketing agreement, and toward the expansion of our marketing territory through revision of our out-worn rail freight rate structure.

The hodge-podge of freight rates which now constitutes Florida's citrus freight rate structure, (apparently based solely upon the principle of charging all the traffic will bear) is the greatest remaining handicap to the intelligent distribution and marketing of Florida's chief product, tending, as it does, to restrict our sales territory to those markets reached by low water and truck rates or by competitive "bargain day" all-rail rates.

This statement has confirmation in a recent bulletin of the Growers & Shippers League of Florida, which shows that we are placing 64% of our citrus in territory containing only 30% of the population; that 14% more goes into territory containing 19% of the population, and that territory containing more than half the population of the country received only 21% of our fruit. Why? Because freight rates practically prohibit the placing of Florida fruit in many markets which should be regularly supplied. Low water and competitive rail rates to the eastern seaboard naturally attract an ever-increasing volume of business to that territory; whereas the high rates to middle and far western points discourage shipments in that direction.

Apparently the initial rail lines serving Florida have never acquainted themselves with that No. 1 principle of merchandizing, i.e., that volume of business can always be increased by lowering prices. They still think they can make a lot of money by collecting high freight rates, regardless of the steadily diminishing volume of business, as these high rates FORCE producers to seek and develop other methods of transportation. The initial lines have so far shown no intelligent interest in the development of the industry, as a direct means of increasing their tonnage. There has been no apparent willingness to cooperate with the industry by providing the sort of transportation service necessary to the industry's normal expansion. On the contrary, they have fought every effort made to secure a revision of rates that would enable Florida to regain the advantage of her nearness to the country's markets,— to which she is entitled.

In fact, from the viewpoint of the average Florida producer, the railroad attitude might be summed up in the following words: "We own the means of transportation. If you fellows want to get your products to market you must use the facilities we provide, and at whatever rates we think the traffic will bear."

How different has been the attitude of the initial lines serving California! They realized the possibility of developing a vast potential tonnage in that territory, provided freight rates could be lowered enough to permit the competitive delivery of California's product **in Florida's natural trade territory,** east of the Mississippi. What they did about it is graphically illustrated in the following table of comparative distances to the ten auction markets, from Los Angeles and from Lake Wales, respectively, together with the rates (expressed in cents per car mile and mills per ton mile) as they are paid by California and by Florida for rail transportation to those markets.

From	Miles		Cents per car mile			Mills per ton mile		
	Calif.	Fla.	Calif.	Florida		Calif.	Florida	
To				One	Two		One	Two
New York	3127	1188	16.48	28.49	20.15	9.15	15.83	11.20
Baltimore	2959	1003	17.42	30.87	23.87	9.67	17.15	13.26
Phila.	3036	1097	16.97	29.54	21.82	9.42	16.41	12.12
Boston	3240	1417	15.90	26.68	19.94	8.83	14.92	11.02
Pittsburgh	2687	1265	19.18	27.32		10.65	15.18	
Cleveland	2569	1272	20.06	28.74		11.13	15.41	
Detroit	2521	1279	20.44	27.87		11.34	15.48	
Chicago	2231	1269	23.10	27.80		12.82	15.45	
St. Louis	2033	1124	25.35	29.15		14.06	16.19	
Cincinnati	2369	1012	21.75	29.88		12.07	16.60	
Averages	2677	1193	19.6	28.6	21.4	10.9	15.8	11.9

The columns headed "Two" under "Florida" list the "bargain day" all-rail competitive rates to the four seaboard auction markets.

This table gives the mileage average of 2677 miles from California to the ten auction markets, as compared with 1193 miles from Florida to the same markets. But although Florida is only 45% as far from the country's principal markets as California, we do not enjoy **proportionately** lower freight charges, per box. On the contrary we pay about one-half more freight per car mile and per ton mile than does California. Even our water rates to New York, Baltimore, Philadelphia and Boston (which look low by comparison) are higher per mile and per ton than the all-rail rates paid by California for transportation clear across the continent.

The railroads serving California, by fixing their freight rates at levels far lower than those of the railroads serving Florida, have made possible the development of California's citrus industry, with resulting profit to both that industry and to themselves. But Florida's citrus industry has "just grown", like Topsy. Picture in your own mind what it might have done with the same degree of intelligent cooperation from its own rail lines!

A quotation from testimony given by witness Kirtland in Florida complaint case, Docket 16939, in 1925, furnishes more light on this subject. He testified: "The railroads established rates to the Atlantic seaboard to assist the California growers in meeting Florida competition, as well as foreign competition, and made those rates the maximum for the entire intermediate territory. Their

rate was made the same to any point just east of Denver and on, and north of the Ohio and Potomac. Those rates were made without regard to the cost of transportation. It was entirely for the purpose of meeting market competition."

What a break that was for California! And what a blow to Florida! In effect, it moved the citrus groves of California half way across the continent; right next door to the great centers of population that were Florida's natural trade territory. Florida thereby lost her geographical advantage.

But it did more than that! Mark well that California's rate is practically the same to **any** point east of the Mississippi, except Florida. It costs no more to ship to Portland, Maine, than to Kansas City. The rate is so elastic that it stretches out, making the freight cost practically the same to every market. It follows that California can set a price on a car of fruit and can hold out for that figure in every market east of Denver, as the car travels toward the Atlantic, because no additional freight charges are piling up as the car moves further and further from point of origin.

Contrast this with the difficult position of the Florida shipper. From Florida the freight rates (to the lay mind) are practically a string of locals. They are non-elastic. Every time a car is moved an additional freight charge will offset the allowance or the lower purchase price they offer. As a result they usually succeed in chiselling the price down, at the producer's expense.

Under this system, the railroads serving Florida not only charge the producer a much higher rate per mile and per ton, but they are also the direct (although perhaps unwitting cause) of the loss to him of a part of the honest sale value of his product. How many millions of dollars this has cost Florida's growers it is impossible to compute, but anyone familiar with the operation of the system knows the loss to be tremendous.

The Florida grower can never hope to receive the full value of his product under this sort of freight rate system; nor can he ever compete on an equal basis with California in the country's markets, and particularly in the mid-west (which is now partially closed to him because of high freight rates) until he can secure a new freight rate structure similar in principle to the system enjoyed by his western competitor.

To secure such a rail rate structure is the objective toward which a united industry is now moving. A lowering of rail rates into mid-western territory will, of course, be a help, but if and when the initial lines serving Florida comprehend their true relationship to Florida's chief industry, they will sit down around the table with the industry's leaders and work out (in a spirit of true partnership) a completely new freight rate structure, based upon zone rates, in a very few widening circles to main diversion points, with a single fixed maximum charge per box to any and all points beyond. Thereby both the rails and the producers will profit; the rails by increased volume of business; the producer by an intelligently designed, elastic system of rates that will aid him in securing the honest value of his product from his dealers, and in distributing Florida citrus more evenly over a much wider territory than is now available to him.

How wobbly our queer rate structure is fast becoming is well illustrated by the "bargain day" rates, applicable to four eastern markets only, which were put in effect by the Florida initial lines Dec. 12, 1935, in a desperate attempt to regain some portion of the steadily increasing tonnage handled by boat. Fifty-five per cent of the total shipments from Florida during the period Sept. 20 to Dec. 11, 1935 had moved by boat! No wonder the rails had the jitters. So the following "bargain day" all-rail competitive rates were made, effective only on boat sailing days,— Mondays, Thursdays, Fridays and Saturdays. The rates given below are from Lake Wales.

To New York, Baltimore and Philadelphia 60c per box, as against the **regular** all-rail rates of 85c to New York, 77c to Baltimore and 81c to Philadelphia. The "bargain day" rate to Boston is 71c; other days 95c. These **regular** rates are still charged to the unfortunate shipper who so far forgets himself as to start a car to either of these markets on a Sunday, Tuesday or Wednesday. Perhaps this funny schedule was designed to inject a humorous note into an otherwise depressing situation.

Another instance is the railroad's handling of the annual effective date of certain so-called emergency rate reductions. Last season the usual 12c **reduction** was delayed until Nov. 11th, all shipments moving prior to that date paying that much more. Our wobbly rate structure is one thing one year, and something else again the next! It is subject to change without notice at the will of the carriers. This sort of uncertainty is not conducive to that felling of mutual confidence which is the only foundation upon which shipper and carrier can work together for the ultimate advantage of both.

Another illustration of the "opportunist" method of altering our rate structure is the rates finally published by the carriers into southern territory,— after about all the business had been lost to the trucks. For several years the rails had turned a deaf ear to the pleadings of the industry to lower their rates into that territory as the only possible means of preserving a semblance of orderly distribution of fruit through the regular channels of trade. They claimed they could not do so.

But after the business had been lost, (with plenty of loss to the industry as well) the rails suddenly discovered, in January of the 1931-32 season, that a 25% reduction of freight charges into this territory was possible. This was solely for the purpose of meeting truck competition into southeastern territory, extending to Atlanta, Birmingham, Montgomery and Nashville, and not for the primary purpose of aiding the industry. The following season the rates were again reduced to meet truck competition as far north and west as Montgomery and Atlanta by 35%, making a second zone beyond that as far as Nashville and Knoxville, and to which a 25% reduction applied, at the same time reducing the minimum carload in railroad owned ventilated box cars to 250 boxes.

The Growers & Shippers League tried to get the carriers to reduce the minimum to 200 boxes and to further reduce the rates, but it was not until this season that the rails were finally convinced of the wisdom of this policy. The rates into southern territory now are 50% of standard rates to zone one (nearest Florida), 35% to zone two and 15% to zone three, with a 200-box minimum.

This is a move in the right direction. It is impossible for dealers in many small cities to advantageously handle a car containing as much as 400 boxes of fruit, but this is still the minimum everywhere except in southern territory and in the far north-west, which is covered by the only blanket rate in Florida's rate structure, with a minimum carload of 360 boxes.

It was only a few short seasons ago,— during a hard year of very low prices,— that a group of large shippers appealed to the Florida initial rail lines to aid the producer (who was getting red ink for his fruit) by a general reduction of freight charg-

es. They pointed out that by so doing the railroads would handle a great deal of fruit that otherwise could not be shipped at all, and that they would also gain some very desirable good-will. It was frankly stated at this time that the only alternative was the development by the industry of cheaper transportation, by boat and by truck, as the producers either had to do that or go out of business, and they had no intention of going out of business. Apparently the railroads thought the shippers were bluffing, for the help they requested was not given. However, the shippers were not bluffing, as the subsequent large-scale development of water and truck transportation has amply demonstrated.

Nor is the industry bluffing today when it demands an intelligent revision of the rail freight rate structure, so as to permit the orderly distribution of Florida fruit over our natural trade territory, under an elastic blanket-rate system similar to that enjoyed by California.

Due to the lower rates finally secured to eastern seaboard markets, through development of water transportation, there has been a tendency (especially in big-crop, low-price years) to ship a disproportionate percentage of the crop to those markets. That 64% of our entire output is going into territory containing only 30% of the population, is a graphic illustration of this tendency. This has thrown the entire machinery of distribution out of balance, and it has become imperative that this balance be restored.

One step in this direction is the new Federal marketing agreement, but this is purely a restrictive measure, valuable only in insuring an even flow of shipments out of the State, but impotent to spread that flow evenly over Florida's trade territory. That can only be done by removing existing freight barriers to the free movement of fruit at a fixed maximum of expense per box to the markets of the country.

Why should Florida fruit travel by rail to New York four days a week, paying 60c per box, and be obliged to pay 85c per box for the same trip if started on one of the other three days? Or is there any good reason why fruit travelling by rail from Ft. Myers to Columbus, Ohio (about the same distance as to New York) should pay 86c per box every day in the week? Again why should a box of California fruit travel from Los Angeles to Boston, 3,240 miles, for $1.11½, enjoying the chances of finding a buyer at every station east of Kansas City, while a box of Florida fruit pays the same amount for transportation from Ft. Myers to Duluth, 1,902 miles, less than two-thirds the distance? To one section of the country Florida enjoys a blanket rate,— to a small group of states in the far north-west. This is California's natural territory. We are permitted the doubtful privilege of entering it by paying a flat rate of $1.62 per box. California can enter Florida's natural trade territory, equally distant, for $1.11½ per box. It don't make sense!

The data I have presented here is for the purpose of supporting three outstanding facts, as follows:

First, that the existing Florida citrus rail rate structure is unsuited to the present-day needs of the industry, because

(a) it fails to insure to Florida the geographical advantage it should have in its natural trade territory;

(b) it tends to induce a glutting of the key markets and to greatly restrict distribution in territory containing over half the population of the country;

(c) it invites dishonesty in the dealer or buyer, and lowers the net receipts to the grower.

Second, that the only material rail freight rate reductions thus far obtained, have come as the direct result of industry development of competing methods of transportation, after appeals to the railroads for revision of rates had proven ineffective,—

(a) by boat to the eastern seaboard, with some combination boat-rail hauls to the interior, and

(b) by truck,— mostly to southern territory.

Third, that the smart thing to do is for the railroads and the citrus industry to quit fighting each other and use their combined energies for the advancement of their mutual interests. A joint transportation committee, composed of leaders of the industry and of the transportation interests should be at work on these problems continuously.

There is the picture up to date. What of the future? Will the industry be forced to continue to deal with the railroads as obstacles to its normal expansion? Or will the railroads join the industry in solving this problem of distribution, sitting around the table with us as true partners in a joint business, combining their energies with ours to work out transport problems to mutual advantage, and assisting us in the further development of markets for the fruit which they hope to carry?

If this is not done, then the industry has no alternative but to further develop competing methods of transportation, by combination water-rail haul to interior destinations from all available points on the Atlantic, Gulf and Mississippi; by long-haul truck transportation direct to receivers, and by such other methods as may prove feasible. We **must** have rates to mid-western territory comparable to those we have obtained for the eastern seaboard. We **must** have a comparatively even freight charge to all the principal markets, in order to make possible an even distribution of our fruit. Accomplishment of this objective (if the railroads cling to their previous policy in dealing with the industry) means development **by** the industry of its own means of transportation. And that many of the large shippers are planning ahead on that basis is no secret! Such a course should not be necessary. We need all our energies to solve the problems of production and marketing, without entering the field of transportation.

Fortunately, the industry is better organized and more nearly unified in thought and purpose than ever before, and there are indications that the railroads are beginning to appreciate the possibilities of regaining much of their lost tonnage by joining with the industry in working out a comprehensive plan to build up the markets for Florida citrus.

It is not difficult to grasp the logic and common-sense of a new relationship between the producers and handlers of citrus, on the one hand, and the initial rail lines serving Florida on the other. After all, their business is transportation; ours the production and marketing of fruit. A full partnership between us for the pur-

C. D. Kime

Consulting Horticulturist

Grove Advisory Service, Soil Investigations, Research

P. O. Box 222
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ORLANDO

pose of increasing the outlet for Florida fruit, and then blanketing the country with an even flow of supplies, through a system of zone rates, in a very few widening circles to main diversion points, with a single fixed minimum charge per box to any and all points beyond, would tremendously profit both the rails and producers.

Through the leadership of the Florida Citrus Commission, ably seconded by the Growers & Shippers League of Florida, and backed by the entire industry (now thoroughly aroused and organized) it is evident that the industry is in a better position to wage a successful fight for an equitable and business-building system of transportation facilities than it has ever been before.

"THE PLIGHT OF GRAPEFRUIT"

(Concluded from last issue)

We can expend 10c a box, as California did, and secure $5 prices the very first season. But we would have to continue spending 10c a box if we expected high prices. Some people are foolish enough to think that we can advertise a few months and the prices will go up and then stop advertising and the prices will stay up. The Ingersoll Watch Company tried this once and a $7,000,000.00 concern went bankrupt in about nine months.

Campbell's Soup cut down 25% on their advertising, and their sales dropped 25% in three months.

If Wrigley Chewing Gum cut down on their advertising for one year, they would probably lose their business.

If Coca Cola stopped their publicity for one year, they would go out of existence—and so on, down the line.

How can we feel that we have the divine right to slam our fruit on to the market and trust to God that a good check will come back, without any effort on our part? Who do we think we are—even admitting that we have got a valuable product.

It is entirely up to us.

If we haven't got the sense to wake up, and do exactly what other successful people are doing, then we can get flattened out until we can get nothing out of our product. It is entirely up to us. We can still get tremendous money from Grapefruit by doing just what other successful producers are doing—or we can continue to get nothing for it by continuing to do what we have been doing—largely nothing.

I have not discussed the detailed method of successfully handling this fruit. That would be long, and a large number of people would prefer to form their own opinions as to whether it was correct or not. My opinion would not be my own. It would be the result of accurate facts gained in the markets.

Our people would rather argue about how a thing is to be done in advance, rather than to employ somebody who knows how to do it, and delegate the job to him. That is the difference between the success of a Corporation and the failure of the Growers. We would prefer to rely on our own opinion of how to do a thing, knowing in advance that we know nothing about it, than we would to employ an expert who knows his Grapefruit.

I hope that eventually we will wake up—as the survival of this Industry in Florida depends on just that. We may go entirely out of existence on Grapefruit, while California and Arizona will plant more and more acres, because they spend money and merchandise it.

At one time we were told that knowledge was power. A little later it was discovered that it took organized knowledge to become power. But still later, as things developed, we found that we must have organized knowledge in action to become successful—and with this thought I leave it to you—to do or die!

STATE CITRUS GROWERS VOTING ON CHANGE IN MARKETING AGREEMENT

Gainesville, Fla. — Florida citrus growers are now voting on an amendment to the citrus marketing agreement which would facilitate operation of the agreement, which was placed into effect near the close of the last citrus shipping season. Officials of the State Agricultural Extension Service have been notified by the Agricultural Adjustment Administration that ballots have been mailed to every grower in the state, giving all growers an opportunity to participate in the referendum.

The amendment, which has received tentative approval by Secretary Wallace, would give the control committee authority, on its own initiative and by giving the person affected an opportunity to be heard, to correct any allotment base if the evidence reveals that such allotment base is inaccurate or inequitable.

Each grower who votes his ballot is to mail it to A. P. Spencer, vice-director of the State Agricultural Extension Service in Gainesville. The first ballots have already been received at Mr. Spencer's office, and other growers are urged to submit their votes at the earliest opportunity.

Ballots will be canvassed later by a committee from the Agricultural Adjustment Administration and the Extension Service, meeting in Gainesville, it was announced.

Citrus groves in Pinellas County have been benefitted by recent much-needed rains, reports County Agent William Gomme. Growers have disked and fertilized their groves and sowed cover crops of cowpeas, beggarweed and crotalaria.

Dusting with one of the fluosilicates is the best method of controlling caterpillars on velvet beans.

'Aero' Cyanamid is the SUPERIOR *Citrus* FERTILIZER

IT

- Supplies nitrogen—more pounds per ton than any other standard carrier.
- Also supplies lime that sweetens the soil.
- Holds fast to the soil—is not washed out by rains.
- Has even, long-time effect required to produce quality fruit.
- Is especially suited for use during the rainy season of early summer, or during the fall when the cover crop is being cut into the soil.

Write for LEAFLET F-136

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'Aero' Cyanamid is Nitrogen plus Lime

Citrus Mealy Bugs

Control Measures For Mealy Bugs . . . On Citrus

BY J. R. WATSON

ENTOMOLOGIST, FLORIDA AGRICULTURAL EXPERIMENT STATION

One pest that is particularly apt to attack citrus fruit at this time of year, particularly if the weather is dry, is mealy bugs. These are particularly apt to attack grapefruit. At this time of year they are apt to congregate at the stem end, under the calix, where they are so well hidden that they ordinarily escape the notice of the grower. If they become abundant in this situation they will cause the fruit to drop. Considerable dropping of young grapefruit which the grower attributes to natural shedding is really caused by mealy bugs. A grower who notices a heavy dropping of young fruit approaching an inch in diameter should examine the stem end of the fallen fruit and also the empty calix from which it has fallen. If he finds that there are considerable numbers of mealy bugs in these situations he should take measures to protect his crop from further damage.

Mealy bugs can be killed by ordinary oil emulsion sprays but because of their tendency to crawl into such crevices where they are well protected, a strong pressure is necessary in order to reach them. The best spray to use will depend very much on what other pests are present at the time of spraying. Either lime-sulfur or an oil emulsion will kill them if it reaches them. In both cases, however, a strong pressure is necessary.

As we told you a week ago, there is at the present time considerable six-spotted mite in the groves. This six-spotted mite, like the mealy bug, is particularly apt to attack grapefruit. In case the six-spotted mite is also present the best combination spray for both this pest and mealy bugs would be lime-sulfur. At this time of year use about two gallons of lime-sulfur to one hundred gallons of water and also add to it from five to ten pounds of wettable sulfur.

If rust mites are also present on the fruit this same combination of lime-sulfur and wettable sulfur would be advised. This will also help to control a light infestation of scale insects and whitefly.

On the other hand, if there are no rust mites or six-spotted mites on the trees, but there is a rather heavy infestation of scale insects and whitefly as well as mealy bugs, the best spray would be one of oil emulsion. On young fruit less than an inch in diameter at this time of year one had better confine himself to one of the whiteoil emulsions but if the fruit is good-sized, an inch or more in diameter, and the trees are fairly dormant,

(Continued on page 18)

R. L. KING, President JACK KERNS, Vice-Pres. HOKE SMITH, Sec. & Treas.

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THE Fertilizer that puts money in your pockets!

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Sales Representative
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Phone 3392

WE SPECIALIZE IN GROVE SERVICE

LYONS RE-ELECTED PRESIDENT RESEARCH INSTITUTE

(Continued from page 9)

rect information, can mix together those ingredients known to be desirable for certain crops or soils. This means that mixtures may be varied as to content of any one or more plant foods; may be varied as to acid, neutral, or basic nature; and, of particular importance, are the benefits of composting and basing some of the ingredients. Scientific research data demonstrating conclusively the benefits of composting and basing have been presented before the country's leading societies of agricultural workers, and are now recognized by leaders as being of fundamental importance to growers in connection with some types of fertilizers."

Mr. Lyons stated that everyone present at the meeting was highly complimentary of the Florida Citrus Commission in connection with its efforts to assist growers in the production of "Better Fruit". Commenting on this Mr. Lyons said "The Commission is in a unique position to serve growers along this and other very important lines. It must be gratifying to everyone in the State to see them take active leadership along this line and base their programs on the best thought and information available from the Department of Agriculture, Experiment Station, Extension Service, and other sources. I am pleased to be able to state that every one of our insecticide members has cooperated with the Commission 100% in this matter and although, in some instances, they have had to make changes in their individual company programs or policies in order to do this, they have been glad to do so for the benefit of the growers and the citrus industry as a whole."

Mr. Lyons stated that the Institute felt that the public agencies, including Experiment Station, Extension Service, U. S. D. A. and the State Control officials in the Department of Agriculture had been of outstanding service to the agricultural public during the past year.

"I feel," he said, "that special commendation is due to County Agricultural Agents at this time. I doubt if very many people realize the great number of added duties these men have had placed on them in connection with AAA and otherwise during the past year or two. It certainly has been a herculean task for them to handle efficiently these new duties and continue at the same time to serve the agricultural public along production lines. From all over the citrus belt I have heard how these fellows worked day and night to cooperate in the Citrus Commission's Better Fruit Program and undoubtedly their activities were responsible to a large extent for the successful manner in which this program was presented to the growers.

"Of particular interest, regarding public agencies," said Mr. Lyons, "is the development and expansion of the Citrus Experiment Station. Certainly everyone in the State should be glad to see the citrus research work enlarged and pushed forward as rapidly as possible, and, speaking for various companies that are in the Institute, I can say that we are happy to have had a small part in making this possible. We want to see all necessary work done and resulting information made public as soon as possible on many of the important questions confronting everyone. We have absolute confidence in the public research workers and, as far as the various types of products represented by Institute members are concerned, we are perfectly willing and happy to have the research agencies develop facts and let the chips fall where they may. In other words, agricultural industries, particularly fertilizer and insecticide industries, can serve the public faithfully and, at a profit to themselves, only as farmers and growers may in turn use their products to their own individual profit.

"The work of the Spectographic Laboratory at Gainesville we feel to be of prime importance to everyone," said Mr. Lyons, "and we are happy to have had an opportunity to cooperate with this laboratory in connection with making spectographic analyses of practically all fertilizer and insecticide materials used in the State. The question of minor elements is considered extremely important here in Florida under our peculiar soil conditions, and we believe that this spectographic work will help solve many of the difficulties confronting growers, and has already given the growers much valuable information on the minor elements that are present in the better grade of fertilizers.

"Another matter of great importance, particularly to farmers producing truck and field crops, is the matter of fertilizer placement," said Mr. Lyons. "A great deal of work has been done along this line in other states, and the Institute is glad to have been able to make it possible for the Experiment Station to have the

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Apply Florida Dolomite now in preparing your soil for Fall truck crops. Florida Dolomite is an excellent soil conditioner – neutralizes acidity – makes other plant foods more available. For maximum production use Florida Dolomite.

Florida Dolomite Company

Pembroke, Florida

necessary implements and equipment with which to carry on research and demonstration plantings in various sections of Florida. This work is scheduled to commence this fall and it is our hope that the Experiment Station may develop much useful information for farmers along this line."

Concluding, Mr. Lyons said, "It is our sole thought and wish to assist in developing better agricultural practices so that farmers and growers may be able to make more profits. This is the foundation of a successful agriculture, as we see it here in Florida. We want facts developed that will show the best place, amount and manner in which to use every fertilizer and insecticide product. This means all products used and sold in Florida whether they are manufactured and handled by our members or not. In other words, we feel that information should be developed and made public as to what is best for farmers and growers and then let fertilizer, insecticide and other companies incorporate such information in their products so that growers and farmers may benefit therefrom."

Other officers of the Institute are R. O. Ferrell of Jacksonville, Vice President; G. H. McCoy of Bartow, Secty and Treas.; Frank L. Holland of Winter Haven, Manager.

SALES PROMOTION DEPARTMENT ESTABLISHED

Headquarters of the sales promotion department of the Florida Citrus Commission have been established in New York City, Secretary F. E. Brigham announced, to maintain close contact with the northern fruit trade. The offices are located at 415 Lexington avenue.

L. W. Marvin, sales promotion director, will direct the Commission's work of promoting the sale of Florida grapefruit, oranges and tangerines with the trade, as he did during the past season. He will be assisted by several experienced merchandising men working in different parts of the country.

Sales promotion plans for next season include the dissemination of accurate information about Florida fruit to distributors and dealers, the development of orange and grapefruit "weeks" and other retail selling stunts, and the distribution of store posters advertising Florida fruit, Brigham said.

Marketing conditions also will be studied, and Florida shippers advised of new developments affecting the sale of their shipments. An important part of the department's work, Brigham declared, will be to get the trade to capitalize upon the Commission's advertising in northern markets to increase consumer demand.

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CHOICE SOUR ORANGE SEEDLINGS for fall planting, very desirable stock. S. G. Coburn, Dade City, Florida.

DOES YOUR GROVE NEED A SUMMER "PICK-UP?" . . .

MATURING crops and heavy summer rains have in many instances depleted the supply of plant foods in grove soils. To keep trees in a thrifty condition, a dependable quick-acting fertilizer is often desirable. IMPERIAL KALTROGEN TOP DRESSER will give your grove extra energy to carry through periods between regular fertilizations. It is a carefully blended all-mineral fertilizer, contains many valuable secondary plant foods, and is economical to use. Ask your local Gulf Field Man to check on the needs of your grove *now*.

"For Everything that Grows in Florida-use GULF Brands of FERTILIZER

Friendly Fertilizers Keyed to Your Soil

THE GULF FERTILIZER COMPANY
36th Street, South of East Broadway, Tampa, Florida

Citrus Fruits, Pruning

CONTROL MEASURES FOR MEALY BUGS ON CITRUS

(Continued from page 15)

as they are apt to be after the dry weather we have been experiencing, the red oil emulsions are comparatively safe.

The best spray we have ever found for mealy bugs is a commercial compound known as Lethane. When this compound is combined with a companion substance known as Lethane Spreader it has given control of all the mealy bugs which are hit. However, this spray is rather expensive to use on a citrus grove. Probably its use would be justified only in the case of a heavy infestation of mealy bugs.

After the grapefruit gets larger, the mealy bugs have the habit of congregating in bunches of fruit in the angles and crevices made by grapefruit touching each other. In this situation they are hard to reach and a strong pressure will be necessary in order to reach them.

As the rainy season comes on in the summer a fungus disease does very efficient work in controlling mealy bugs in groves, so it is only during the dry spring months and the first part of the summer before this fungus disease gets a good start that mealy bugs are troublesome, although they may get abundant in the fall after the rainy season has ceased.

Mealy bugs, like whiteflies, give off honey dew in which the sooty mold grows. They give off honey dew even more copiously than the whiteflies so that fruit infested with mealy bugs gets exceedingly black in spots. The portion of the fruit under this sooty mold is often slow to color, making the fruit spotted. This is particularly serious on early grapefruit which one wants to market as promptly as possible.

Besides citrus mealy bugs attack a large number of plants, including sugarcane, and particularly such ornamentals as crotons, acalypha, etc. They even attack the roots of many plants, such as the common ragweed and others. Ornamentals and other very valuable plants can be sprayed with Lethane and Lethane Spreader for the control of this pest, although nicotine and pyrethrum compounds, if used under good pressure, will also be effective though more applications may be necessary.

Mealy bugs are often confused with cottony cushion scale. Mealy bugs, however, never get as large as a full grown cottony cushion scale and the fluted cottony mass so characteristic of the cottony cushion scale is not present in mealy bugs. The full grown female of the cottony cushion scale does not move about; mealy bugs move in all stages of life. It is easy to separate the full grown mealy bugs and the full grown cottony cushion scales, but the young are not so easily told apart. However, when a mealy bug is crushed its body fluid seems to be yellow in color, whereas that of the cottony cushion scale seems to be distinctly reddish or orange in color.

A number of years ago the Experiment Station introduced a parasite enemy of mealy bugs, a ladybeetle known as Cryptolaemus or for short, simply Crypt. Although in some cases these Cryptolaemus ladybeetles persisted in groves they have not, as far as we know, ever become permanently established in a grove. It is necessary to raise these beetles each winter to be liberated in the spring. They are raised on mealy bugs on sprouting potatoes. For several years the Experiment Station raised these beetles but for the past several years this has been carried on by a commercial firm in Orlando which raises the beetles for shipment.

One must remember that this ladybeetle is not the same as the Australian ladybeetle which furnishes such an effective control for the cottony cushion scale.

Keeping A Citrus Tree In Bearing With Special Reference to Pruning

By George D. Laidlaw, Upland

Paper Read at Claremont Pomological Club Meeting, and Published in California Citrograph

E. L. Koethen of Riverside made the valuable suggestion that a sucker limb was simply a growth seeking the light. That coming out from a shaded portion of the tree it continued its strong upward growth until it reached the light when it would branch and throw as good fruit wood as any other part of the tree, and after a couple of years in production the fruit, at first coarse, is soon as good as the average.

The great mistake of the period was in allowing too many of these limbs to develop, making a crowded framework, too many scaffold limbs, interferring with a strong well spaced, balanced framework of not

ORANGOL
Spray Emulsion
For Summer Use

Is a complete spray. It requires no addition of other materials, no mixing, no doctoring. As you receive it from us it is ready for immediate application.

It has proven a most satisfactory summer spray for citrus groves and many users declare it to be most effective in controlling Scale Insects and White Fly.

ORANGOL is not an experimental product. Its effectiveness has been repeatedly and definitely proven.

Judged by results ORANGOL Spray Emulsion is the most economical spray on the market.

ORANGOL BOOKLET AND INFORMATION
MAILED IMMEDIATELY UPON REQUEST

ORANGE MANUFACTURING CO.
ORLANDO, FLORIDA

more than four, and preferably three, foundation limbs. These in turn will fork and leave the tree much more open to the air and sunlight, which is essential to the full development of good inside fruit wood.

Generally speaking, with this exception of well spaced scaffold limbs, no pruning is needed until the third year, keeping out the watersprouts from the works, leaving the fruiting branches to develop naturally.

Coming to maturity brings another problem—how to maintain this good inside fruiting wood. From year to year the outside shell of foliage becomes more dense, inside wood weakens. Pendant branches resting on those beneath them put them out of commission. Many groves were spoiled by a shearing process on the outside to a vase shape or a flat top; or the Boronia style, pruning to a cup shape or hollow center, which resulted in suckers galore and sunburned branches or bark suddenly exposed to the direct rays of the sun. Such systems brought pruning into disrepute.

In 1914 (following the year of the big freeze), seeing this, A. D. Shamel, who had done a splendid piece of work in bud selection and through the cooperation of Ethan Allen Chase of Corona, started an experimental pruning plot at Corona in which six experienced pruners tried their varios methods on certain rows, leaving every other tree unpruned. A careful check was kept and at the end of 17 years there was only a few pounds difference in fruit production between the pruned and unpruned trees.

Now this gave a serious setback to the pruning idea. Pruning costs money and if it is not essential, why do it? Why did not Mr. Shamel find a greater return? In the first place he was dealing with young trees. Planted in 1903 and pruned in 1914, one year after the big freeze, they were only 11 years old, and should not have required much pruning. And again Mr. Shamel records these trees were suffering from nitrogen starvation; were not large producers. Proper methods of pruning had not then been worked out and nothing is more costly than poor pruning.

When Prof. Whitten introduced his long method of deciduous tree treatment I was at once impressed with the similarity of his methods to those of E. S. Lewis in pruning citrus: Seldom if ever to cut back the main terminal branches, but make room for them to swing free and clear. Cutting back to the forks or to what some people call "riders"

(Continued on page 22)

The Vital Elements are in this Natural Nitrate

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Natural Chilean contains almost two score of major and minor elements such as boron, magnesium, manganese, iodine, calcium, potassium, etc.—each a vital element in growth and healthy development of plants.

Feed your trees with Natural Chilean Nitrate and two things happen:

1. Your trees get their needed nitrogen in quickly available form.
2. They get in addition, a *naturally balanced* feeding of minor elements, the vital impurities.

NEWEST plant food knowledge gives high importance to Chilean's impurities. They are the Vital Elements such as copper, boron, manganese, magnesium, iodine, calcium and many others, now known to be vital to tree health and growth. And in Natural Chilean, because it is a natural nitrogen, these Vital Elements are present in Nature's *own wise balance and blend.*

The Vital Elements in Natural Chilean make it the dependable nitrogen fertilizer . . . the plant food which insures quality as well as quantity in yield.

Ask for Champion Brand. It is Natural Chilean Nitrate in tiny "bird shot" form, snow-white and free flowing. Even-weight, paper lined bags, always in perfect condition. FREE – Our interesting and valuable new book "Vital Impurities." Write for a copy.

Chilean Nitrate Educational Bureau, Inc.

Natural
CHILEAN NITRATE
of Soda

WITH VITAL ELEMENTS IN NATURE'S OWN BALANCE AND BLEND

Date Palms

THE VALUE OF SUMMER COVER CROPS

(Continued from page 5)

this is not done, a greater supply of crude organic carriers of plant nutrients must be purchased in the fertilizer sack in order to obtain economical crop returns. Such organic residues must not only serve as food for the numerous beneficial soil microorganisms, but within themselves are important carriers of plant nutrients.

The plant nutrients which cover crops absorb from the soil are released from the materials when they are incorporated with the soil and cover crop. Thus the succession of phosphorus, calcium, magnesium, iron and even the trace elements which are taken up by the cover crop during its growth are subsequently released and made partially available to the crop growing on the soil following the incorporation of the cover crop. Thus the successin of crops becomes an important study and, in many instances, rotations have failed because of lack of consideration of the possible effect of one crop on the crop following its incorporation.

There are many factors aside from the ordinarily accepted influence of one crop on another and recent studies on the effect of organic compounds and the so-called trace elements on plant growth are opening up a new approach to this problem as well as to the effect of cover crops on tree growth. However, there remains the fact that cover crops must exert a very definite influence on plant growth not only through their decomposition processes in the soil but also through the turnover of plant nutirents contained in and released by them.

A discussion of the relative merits of leguminous and non-leguminous plants as summer cover crops might be of interest. As a general rule, the leguminous plants when adapted to the soil conditions of a culture are the more valuable summer cover and manure crops. This is due to the fixation of nitrogen from the air by the microorganisms which cause the nodules on the roots. Therefore, these plants do not draw on the nitrogen supply of the soil but add nitrogen when incorporated with the soil. When decomposing in the soil, they furnish readily available nitrogen compounds to the crops following them. They are usually rank growers under favorable conditions and give high yields. However, under some conditions they are subject to either disease or insect injury or for some unknown reason will not develop satisfactorily. Under these conditions, non-leguminous plants are preferable as summer cover crops.

Usually a suitable grass is used for this purpose or, in many cases in the general farming area, volunteer weeds and grasses are found valuable. When the mature non-leguminous cover crop is incorporated with the soil, it must have soluble nitrogen compounds for its decomposition because of its low nitrogen content. For this reason, it uses the soluble nitrogen compounds formed in the soil and any crop planted immediately after the incorporation of a large quantity of a non-leguminous cover crop is likely to suffer for nitrogen if compounds of this element are not supplied. The application of either ammonium salts or other nitrogen carriers is desirable under these conditions. After a period of decomposition in the soil, the mature non-leguminous cover crops readily supply their nitrogen in a soluble and available form to a growing plant.

We have discussed only a few of the many advantages of summer cover crops but we believe these should convince you of the value of the cover crop in conserving the fertility of your soil and increasing your crop growth.

KEENAN SOIL LABORATORY

Is an organization of **specialists** devoting their **entire time** to **soil hygeia** and **plant diet**, unique in the U. S. It offers a **yearly service** by which trained men inspect groves and sample soil for laboratory and pot tests. Not concerned with selling fertilizers. If interested in **reducing costs** and producing true **quality fruit**, address at

Frostproof, Florida

TOLLEY SUCCEEDS DAVIS AS AAA ADMINISTRATOR

Announcement that Howard R. Tolley would head the Agricultural Adjustment Administration, succeeding Chester C. Davis, was made by Assistant Secretary M. L. Wilson, in the absence of Secretary Henry A. Wallace.

Mr. Davis will retire as soon as his appointment is completed as a member of the Federal Reserve Board.

DATE PALM SCALE QUARANTINE REVOKED

The apparent eradication of the date-palm scale has lead Secretary the Federal date-palm scale quarante (No. 6), effective July 1, 1936. Under the quarantine, which was promulgated in March 1913, the inter-state movement of date palms and date-palm offshoots was regulated from certain areas in California, Arizona, and Texas, on account of the Parlatoria scale, an injurious date-palm scale insect.

Eradication of this pest, which has been the subject of a vigorous eradication campaign conducted cooperatively by the affected States and the United States Department of Agriculture for a number of years, has apparently now been effected, as intensive inspection of the previously infested areas has revealed no infestation since 1934, the infestation at that time being extremely light. It is therefore believed that domestic quarantine restrictions may be removed with respect to the Parlatoria scale with safety to the date-growing areas.

NITROSE

Accepted by the Packing and Canning Industry of Florida as the Arch Enemy of Rust.

Particularly effective for submerged work, soaking tanks, brine rooms, acid conditions and just plain Rust.

Write for descriptive printed matter and long list of Florida references. Sample sent on receipt of 10c to cover carrying charges.

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Permite Aluminum Paints, ready mixed —heat resisting and non-corrosive— Brilliant, lasting, protecting.

Floor repair and resurfacing material, including Ruggedwear Resurfacer, Concretdense, Flexrock and Flintcrust.

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RUST-TOX. A rust inhibited prime coat of greater coverage and efficiency.

WYOLITE. Exploded mica insulation of extraordinary insulating efficiency and value. Unexcelled for Sound Deadening.

Citrus Fruits, California

CALIFORNIA-ARIZONA CITRUS ORDER AMENDMENTS APPROVED

Amendments to the order for handlers of oranges and grapefruit grown in California and Arizona which are designed to provide additional flexibility in the operation of the marketing program, have been sued by the Secretary of Agriculture.

In general, the amendments deal largely with the administration of the order and are concerned with the methods by which regulation of shipments is adapted to the operations of the shippers of fruit from the producing area. The modifications were suggested by the Growers' Advisory Committee, administrative body of the program, and according to a determination by the Secretary, are favored by more than two-thirds of the growers.

Agnes Vincent, of Zellwood, made the highest score in the 4-H club health contest in Orange County, according to a report from Miss Nellie Taylor, home agent.

FARMERS AND GROWERS O FSOUTHERN FLORIDA SIGN IN SOIL PROGRAM

Farmers of the southern part of Florida are showing considerable interest in the agricultural conserva- program, which has been presented to them in recent weeks by county agents, says H. G. Clayton, in charge of this program in Florida for the State Agricultural Extension Service. Large numbers of them have filed "work sheets" already, and others are expected to do so before the cut-off date, July 20.

In order to facilitate work on the program, it has been necessary to set July 20 as the closing date for receiving applications from all counties from Levy, Marion and Flagler south, Mr. Clayton explains. Counties to the north and west already have been closed.

This is the first year that the federal program has been applicable to truck crop and fruit lands.

The beauty of Florida and the variety of its products are being shown to millions at Cleveland this summer.

SEASONABLE RECIPES

Nectar Dressing

1 package cream cheese
3 tablespoons sugar
¾ cup salad oil
1½ tablespoons lemon juice
Grated rind 1 lemon
Dash of cayenne

Blend well the cheese, sugar, lemon juice and seasonings. Continue to beat adding four tablespoons of oil, one at a time. Then add two at a time till oil is used. Chill before using.

* * * *

Frozen Pineapple Salad

1 large can shredded pineapple
1 large can Royal Anne cherries
1 large can peaches
1 cup mayonnaise
2 cups whipped cream

Pit the cherries and cut peaches into small pieces. Mix all the fruit, the mayonnaise, and the whipped cream, and freeze. Serve on lettuce with mayonnaise mixed with whipped cream.

For Better Quality Fruit *Get Better*

* **I-C** stands for insect control—one of the big factors today in producing more top-grade fruit in Florida. To get your money's worth, be sure the insecticides you use give you full coverage and kill every time you spray or dust. Here are dependable quality insecticides that measure up in results and economy.

WHITE BAND Dusting Sulphur

analyzes more than 97% sulphur by weight through 325-mesh screen. It is the "fines" in dusting sulphur that give more surface exposed and quick fuming for better "I-C." **WHITE BAND** is pure sulphur with specially processed spreader and sticker, and lasts on tree and fruit. Specify **WHITE BAND** next time you order.

WHITE BAND Wettable Sulphur and Lime-Sulphur Solution

are other high-grade products that have been tried and proved by Florida growers. Use them for spray economy and high "I-C."

I-C★

WHITE BAND I-C

"True To Label"

HIGH "I-C" VALUE

INSECTICIDES

Made in Florida, in the South's most modern insecticide manufacturing plant, especially for Florida fruit and truck growers. Sold by leading distributors of high-grade insecticides. Ask your dealer for full information about WHITE BAND products.

U. S. Phosphoric Products Corp. . . . Tampa

KEEPING A CITRUS TREE IN BEARING WITH SPECIAL REFERENCE TO PRUNING

(Continued from page 19)

when the elder branches begin to show decline. This calls for a periodic pruning about once in five years. With a light follow-up for two years to remove the collar buds wherever a cut is made for the growth at this point is not desirable. It is needless to say that unless the tree is of a good fruit type it is useless to prune it and in most cases it is better to plant a good young tree than to rebud an old one.

Summing up, we find it necessary to train young trees only for the foundation framework about the third year. In older trees beginning to show decline, the removal of sucker limbs from the crotches to give more openness to light and opportunity for new fruiting wood within the tree by a systematic under-cutting of the older fruiting branches beginning at the bottom and cutting from the trunk those long branches which 20 or 30 years ago were the original fruiting branches of the young tree and which now rest upon the ground with only a fringe of old fruiting wood on the terminals.

Cut out the old, let in the new, in a systematic removal from the bottom to the top of the tree of those branches that have lost their power to produce healthy leaves or fruit. In fact with a few cuts at the top you can make an opening like an inverted cone that will flood the interior in response to nature's law, "Let there be light." There will be re-creation of growth, but it is better to get these openings from all around the trees. If in the top, see that you whitewash any large limbs exposed to the direct rays of the sun to prevent sunburn. Cutting out too few branches will defeat the objective just as quickly as too many.

Use judgment as well as your pruning saw, and you will find the real values in pruning as a method of keeping your trees in production.

FOR SALE

Lists of Florida Citrus Growers compiled from recent survey of groves, arranged by counties. Names, address, acreage and legal description.

Also List wealthy residents of Florida

National Survey Co.
P. O. Box 163
ATLANTA, GA.

The most practical method of controlling chinch bugs in St. Augustine grass is the use of finely-ground tobacco, preferably with a high nicotine content—2 percent if possible. It is a good fertilizer and is cheap. Liberal applications of this material are effective.

In a year, consumers of the United States eat somewhere near 150 billion pounds of food, use over 20 billion board feet of lumber, and purchase around 2½ billion pounds of cotton and wool materials.

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Advertisments

The rate for advertisements of this nature is only five cents per word for each insertion. You may count the number of words you have, multiply it by five, and you will have the cost of the advertisement for one insertion. Multiply this by the total number of insertions desired and you will have the total cost. This rate is so low that we cannot charge classified accounts, and would, therefore, appreciate a remittance with order. No advertisement accepted for less than 50 cents.

2 YR. FIELD GROWN ROSE BUSHES: Red, Pink, Shell, Salmon, White Radiance, Hollande, Columbia, Briarcliff, Sunburst, Pres. Hoover, Victoria, Talisman, Sensation. All 19c each, postpaid. Ship C.O.D. NAUGHTON FARMS, Waxahachie, Texas.

CAUSERIENCE LEPIDOFLOIA—(So-called Brazilian oak), resembles Australian pine. Grand for wind-breaks. Cold resistant. Beautiful. Send for sample of foliage. $6.00 per 100. S. S. Matthews, Homestead, Fla.

ALYCE CLOVER, the best legume for hay or covercrop. Write for information. Hardin Groves, Box 63, Lakeland, Fla.

FOR SALE—80 acres good citrus land, two miles northwest of Cocoa, Brevard County, Florida. Price $1600.00 cash. S. Hendry, City Point, Florida.

FILMS DEVELOPED 2 prints of each 25c; 20 reprints 25c. Pine Photo, Y-5134 Nevada, Chicago.

THRIFTY TREES and budwood from record performance Perrine Lemon parents. Persian Lime and other citrus varieties. DeSoto Nurseries, DeSoto City, Fla.

CROTALARIA—New crop, high quality, double cleaned, scarified Crotalaria Striata seed for sale. Attractive prices. Carolinas' Crotalaria Co., Camden, S. C.

UP to $20.00 paid for Indian Head Cents; Half Cents $125.00; Large Copper Cents $500.00, etc. Send dime for list. Romanocoinshop, D. Springfield, Mass.

LARGE CITRUS trees for replanting at special low price. Grafted avocado trees and budwood of Perrine lemon and Tahiti limes. WARD'S NURSERY, Avon Park, Fla.

FOR SALE—Small packing house machinery and equipment complete. Apply Hector Supply Company, Miami.

MEN WANTED—Sell shirts. No experience necessary. Free samples. Commission in advance. Free ties with shirts. Carroll Mills, 875A Flatbush Av., Brooklyn, N. Y.

HARDIN'S SPERRYOLA Lemon, a profitable adapted commercial variety for all sections. Hardy, prolific grower and producer. Limited number choice trees. Hardin Nurseries, Box 63, Lakeland, Fla.

WANTED—Man with from ten thousand to twenty thousand dollars to grow an entirely new orange for the U. S. markets. Cheap lands, no cold, plenty water, no fertilizer. A world beater in an orange. Patented.—Address, Buen Negocio, Gaveta-1, Holguin, Cuba.

PERSONAL—Quit Tobacco easily, inexpensively, without drugs. Send address. N. A. Stokes, Mohawk, Florida.

WANTED—To hear from owner of land for sale. O. Hawley, Baldwin, Wis.

FREE Booklet describes 87 plans for making $20-$100 weekly, home or office, busiyour own. Elite Service, 505 Fifth ave., New York City.

WANTED—To hear from owner having good farm for sale. Cash price, particulars. John Black, Chippewa Falls, Wisconsin.

PUREBRED PULLETS FOR SALE—White Leghorns and Anconas ready to ship. Barred Rocks and R. I. Reds shortly. Several hundred yearling White Leghorn hens now laying 70%. Write or wire for prices. C. A. Norman, Dr. 1440, Knoxville, Tenn.

LAREDO SOY BEANS, considered free from nematode, excellent for hay and soil improvement. Write the Baldwin County Seed Growers Association, Loxley, Alabama, for prices.

FANCY ABAKKA pineapple plants. R. A. Saeger, Ankona, Florida.

FOR SALE—Selected budwood and trees of Perrine lemon, Tahiti lime, new varieties tangelos and other citrus. Ward's Nursery, Avon Park, Fla.

SCENIC HIGHWAY NURSERIES has a large stock of early and late grapefruit and oranges. One, two and three year buds. This nursery has been operated since 1883 by G. H. Gibbons, Waverly, Fla.

NEW COMMERCIAL lemon for Florida, the Perrine; proven. All residents need yard trees, keeping Florida money at home. Booking orders for budded stock for Winter delivery. DeSoto Nurseries, DeSoto City, Fla.

SATSUMA BUDWOOD from Bearing Trees. Hills Fruit Farm, Panama City, Fla.

SEED—Rough lemon, sour orange, cleopatra. New crop from type true parent trees. Also thrifty seedlings. DeSoto Nurseries, DeSoto City, Florida.

BUDDED trees new Florida commercial lemon, proven, thin skinned, juicy, scab immune. Also rough lemon, sour orange and Cleopatra seed and liningout seedlings. DeSoto Nurseries, DeSoto City, Fla.

SEEDS—ROUGH LEMON, SOUR ORANGE, CLEOPATRA. Pure, fresh, good germination. Also seedlings lineout size. De Soto Nurseries, DeSoto City, Fla.

CROTALARIA SPECTABILIS—Seed for sale. New crop, well cured, bright and clean. Price 25c per pound in 100 pound lots and over, 30c per pound in less quantities, f.o.b. Hastings, Bunnell, Lowell and San Antonio, Florida. F. M. LEONARD & COMPANY, Hastings, Florida.

WANTED—Position as packing house foreman; in citrus business twenty-five years; ten years' experience as foreman; married man. J. R. Henry, Okahumpka, Florida.

IF suffering with Piles, I want to help you. Drop me a line explaining.
Fred C. Whitney
317 6th Ave., Des Moines, Iowa

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JACKSONVILLE, FLORIDA

A Simple, Effective, Accurate FRUIT SIZER

Photographic Illustration of HATTON FRUIT SIZER

Has been successfully developed in the HATTON FRUIT SIZER.

This knife first placed on the market three seasons ago has proven highly popular with packing houses and grove operators — supplying a need not heretofore satisfactorily cared for.

Made of the finest grade Stainless Steel the knife holds a keen edge. It's 7-inch mirror finished blade is firmly riveted to a smooth stained hardwood handle.

Designed for maturity testing the blade has etched on it citrus fruit sizes from 36 to 324 and this season also carries the juice content chart.

It is the most accurate Handy Fruit Sizer yet developed and is endorsed by leading citrus men. Has been used by State Green Fruit Inspectors the past two seasons.

It is fully guaranteed as to accuracy, workmanship and quality.

PRICES

Single Knife - -	**$2.00**
Half Dozen Lots -	**1.95**
One Dozen Lots -	**1.90**

In order to secure prompt delivery we suggest that you place your orders immediately.

HATTON FRUIT SIZER
BARTOW, FLORIDA

Citrus Fruit Buds And Some Factors Influencing Their Differentiation

BY CHAS. E. ABBOT

At Meeting of Florida State Horticultural Society

During the course of the last few years investigations have been carried out with a view of determining the factors involved in the yield of various fruit trees. Fruit production in all trees and plants depends upon two very fundamental factors, viz., the formation of fruit buds and the ultimate setting and maturing of fruit from these buds.

Most fruit trees bear blossom buds that are easily recognized during the dormant season. This is particularly true with many deciduous trees. Such, however, is not the case with evergreen trees, especially those belonging to the genus Citrus.

The species of Citrus studied presents an entirely different problem to that of most deciduous trees, in that it is impossible to distinguish, with any degree of accuracy, between what ultimately will be a fruit bud and a vegetative bud, either by the position of the bud on the tree or by the size and shape of the bud prior to the beginning of a growth flush.

It was not until the close of the last century that horticulturists, realizing the probable importance of the time of application of measures designed to control fruit bud formation set themselves the task of determining microscopically the time of year at which this blossom forming process was initiated.

The question, therefore, resolves itself into a study of the changes that take place in blossom bud development, the time when these changes occur, and the conditions that influence them. Such a study has been undertaken by the speaker.

The materials used in this study were collected from the trees growing in the grounds of the College of Agriculture, Gainesville. The varieties studied were the Duncan grapefruit, Pineapple orange, Owari satsuma and Nagami kumquat.

The collection of material was started in November of 1927, and after that collections were made from orange and grapefruit trees at weekly intervals during the greater part of each year until March, 1932, with two exceptions. During late December, 1927, low temperatures destroyed the buds and in many cases killed the grapefruit and orange branches back for a considerable distance, thus destroying all bearing wood. Then again in 1930 it was thought unnecessary to collect materials due to the weakened condition of the trees following the maturing of a very heavy crop of fruit the previous season.

The satsuma trees were not injured as badly by the low temperature as were the grapefruit and orange trees. Therefore it was possible to make a complete series of collections during 1928 as well as in 1929.

The kumquat buds were collected throughout the season of 1930.

The buds after being dehydrated were embedded in paraffin and cut in longitudinal sections by the use of a

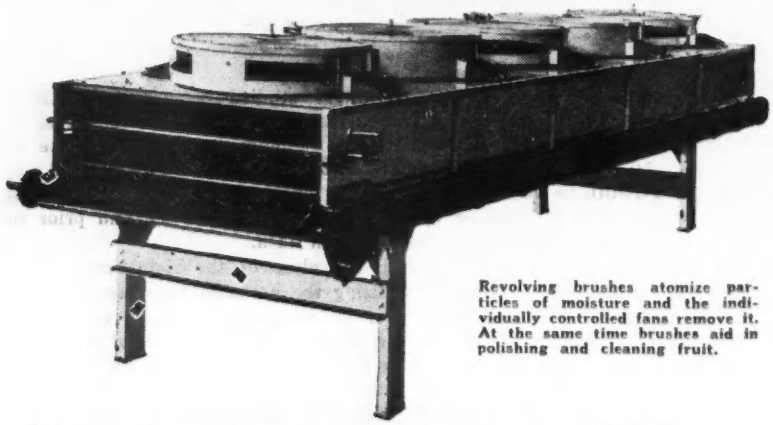
(Continued on page 15)

FMC

EVERY type of equipment needed to wash Citrus Fruits better, polish better, size and grade better and handle fruit more gently for a better quality pack, is made and serviced in Florida by the world's largest manufacturers of food processing machinery.

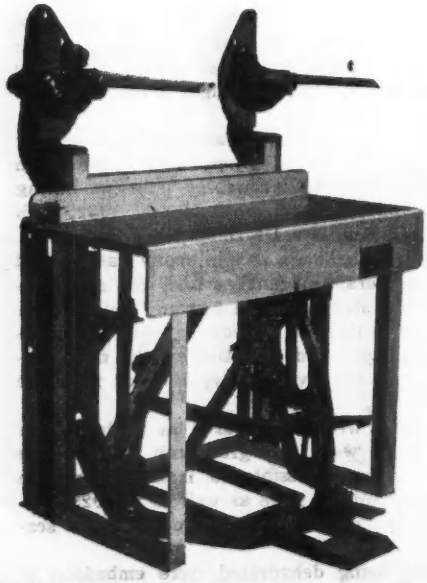
New "Double-Action" Transverse Air-Brush Drier Speeds Packing

BECAUSE it combines more efficient drying and aids in better cleaning and polishing of fruit, the new FMC Transverse Air-Brush Drier helps speed packing operations through its "double-action" features. Moreover, this new drier is far more economical of floor space than any other type. It is equipped with silent chain drive operating in oil, requires no frequent lubrication, and has the new FMC quick-change brush feature.



Revolving brushes atomize particles of moisture and the individually controlled fans remove it. At the same time brushes aid in polishing and cleaning fruit.

This is another improved, up-to-date unit in the famous FMC Transverse line of packing house machinery. It is built of steel for long trouble-free service. Get complete details now . . . or ask to have one of our engineers call.



New FMC "Universal"

BOX PRESS

It lids all standard packed boxes from 1 3-5 bushels to 4-5 bushel and tangerine boxes . . . on one press. That's news for packing house managers! No more "hand work" in lidding other than full-size boxes. Change for different boxes can be made in a jiffy . . . no delay. OLD type FMC Box Presses can be made "Universal" at low cost. Write for full facts.

"Pre-Boraxing" Treatment for Better Control of Mold and Stem-end Rot

Unless fruit holds up well on the way to market and after it reaches retailer and consumer, shippers face a material loss. Use of borax for better control of blue and green mold and stem-end rot has proved its worth in the citrus industry, as a means of improving the "keeping quality" of fruit.

More research into the problem of decay control has led to adoption of the "pre-boraxing" process by successful shippers. Fruit is treated with borax as received from the grove, in order that spores of decay diseases may not have time to bore into the fruit and possibly out of reach of later treatment.

Special Equipment

Recognizing the importance of decay control, Food Machinery Corporation has developed a "pre-boraxing" process and equipment now in successful use. Fruit is dumped from field boxes into a short washer, then goes into the borax tank for treatment at automatically controlled temperature. After leaving the borax tank, fruit may be rough-graded for color, and coloring room treatment keyed according to the needs of the fruit. Since the fruit is warm when it leaves the borax bath, coloring room operations are speeded up.

This "pre-boraxing" unit fits in with the present interest in better methods of decay control. FMC engineers are available to discuss and plan equipment for this and every other process in handling fruit for a better quality pack.

FOOD MACHINERY CORPORATION

Florida Division DUNEDIN, FLORIDA